

REMARKS

The Final Office Action mailed April 24, 2001, has been received and reviewed. Claims 23 through 28 are currently pending in the application. Claims 23 through 28 stand rejected. Applicants propose to amend claims 25, 26 and 27 and respectfully request reconsideration of the application as proposed to be amended herein.

35 U.S.C. § 112 Claim Rejections

Claims 25 through 28 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully traverse this rejection, as hereinafter set forth.

The phrase “a dielectric layered silicon substrate” found in claims 25 and 26 is the basis for the 35 U.S.C. § 112, second paragraph, rejection. More specifically, the rejection is based upon the contention that it “is unclear as to how a dielectric can be silicon since silicon is a semiconductor?” *See, Official Action* at 2. Applicants herein amend claims 25 and 26 to overcome this rejection. The confusion caused by the phrase “a dielectric layered silicon substrate” is corrected by the amendments proposed herein. Applicants respectfully request that the amendments be made and the claims allowed.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 5,428,244 to Segawa et al.

Claims 23 through 28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Segawa et al. (U.S. Patent No. 5,428,244). Applicants respectfully traverse this rejection, as hereinafter set forth.

The rejection under 35 U.S.C. § 102(b) is unchanged from the last Official Action and Applicants hereby incorporate their previous arguments. The responses to Applicants’ previous arguments, and the allowability of the claims, are addressed with respect to claims 23 through 28.

Claim 23 specifically recites “a gate stack, including a non-crystalline metallic silicide film.” (Emphasis added). Segawa et al. does not disclose a non-crystalline gate stack. Rather, Segawa et al. specifically states that the tungsten silicide film is crystallized. *See, Segawa et al.*, col. 13, line 68 through Col. 14, line 4. Because Segawa et al. fails to expressly or inherently describe a non-crystalline gate stack, claim 23 is not anticipated. *See, Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Furthermore, even if the tungsten silicide film of Segawa et al. is at one point non-crystalline, Segawa et al. definitely teaches that in the final gate stack structure, the tungsten silicide is crystallized. The intermediary structure of Segawa et al. is not a gate stack, as claimed in claim 23. Therefore, claim 23 is allowable.

Also, claim 23 is not directed at an intermediary structure during gate stack formation. The claim specifically recites “a gate stack” which includes a non-crystalline metallic silicide film. If the true basis for the rejection is in fact that “this invention also describes about an intermediary metallic silicide, not a final gate stack,” then a 35 U.S.C. § 102(b) rejection is inappropriate and the final rejection should be removed and the new basis for rejection propounded.

The Official Action also indicates that Applicants’ argument that “Segawa et al. does not disclose a gate stack substantially devoid of silicon clusters...is not convincing because Segawa et al. clearly describe the formation of non-crystalline metallic silicide layer.” *See, Official Action* at 4. Applicants do not solely claim a non-crystalline metallic silicide layer, however. Applicants do claim a gate stack having a non-crystalline metallic silicide film. Such a gate stack is not taught by Segawa et al. Therefore, claim 23 is allowable over Segawa et al.

Similarly, claim 25 recites a “gate stack...comprising...a non-crystalline metallic silicide film disposed over said polysilicon layer.” Claim 27 recites a gate stack structure “wherein said gate stack includes a non-crystalline metallic silicide film.” Segawa et al. does not teach or suggest the formation of a gate stack comprising a non-crystalline metallic silicide film. Instead, Segawa et al. only teaches that at an intermediary point in the fabrication of the Segawa et al.

gate stack structure, a non-crystalline metallic silicide film is deposited. However, that film is later crystallized. Thus, claims 25 and 27 are not anticipated.

Claim 24 recites “A gate stack, including an amorphous metallic silicide film wherein said metallic silicide film is substantially devoid of silicon clusters.” Similarly, claim 28 recites a gate stack structure “wherein said gate stack includes an amorphous metallic silicide film substantially devoid of silicon clusters.” Segawa et al. fails to teach, or even mention, an amorphous metallic silicide film, thereby precluding a 35 U.S.C. § 102(b) anticipation rejection. *See, Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Furthermore, the Official Action does not propose any teachings by Segawa et al. which anticipate Applicants’ previous amendment to claim “an amorphous metallic silicide film” as in claims 24 and 28. Thus, claims 24 and 28 are allowable over Segawa et al.

Amended claim 26 recites “a gate stack structure comprising a gate stack on a dielectric layer, over a silicon substrate, wherein said dielectric layer is substantially devoid of pitting.” Nowhere in Segawa et al. is a gate dielectric layer substantially devoid of pitting taught or suggested. In fact, Segawa et al. teaches the crystallization of the metallic silicide layer which inherently results in the formation of silicon clusters in the metallic silicide layers. Such silicon clusters result in the pitting of the dielectric layer during etching. Therefore, the structure of Segawa et al. necessarily results in a gate stack having a pitted dielectric layer. Without teaching otherwise, Segawa et al. does not anticipate claim 26.

ENTRY OF AMENDMENTS

The proposed amendments to claims 25, 26 and 27 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search. Finally, if the Examiner determines that the amendments do not place

the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 23 through 28 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully Submitted,



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Enclosure: Version With Markings to Show Changes Made

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

23. A gate stack, including a non-crystalline metallic silicide film.

24. (Previously Twice Amended) A gate stack, including an amorphous metallic silicide film wherein said metallic silicide film is substantially devoid of silicon clusters.

25. (Thrice Amended) A gate stack on a [dielectric layered] silicon substrate having a dielectric layer thereover, comprising:
a polysilicon layer disposed over said dielectric [layered silicon substrate] layer;
a non-crystalline metallic silicide film disposed over said polysilicon layer; and
a dielectric cap on said non-crystalline metallic silicide film.

26. (Twice Amended) A gate stack structure comprising a gate stack on a dielectric [layered] layer, over a silicon substrate, wherein [a gate] said dielectric layer [of said gate stack] is substantially devoid of pitting.

27. (Amended) The gate stack structure of claim 26 wherein said [a] gate stack includes a non-crystalline metallic silicide film.

28. (Previously Twice Amended) The gate stack structure of claim 26 wherein said gate stack includes an amorphous metallic silicide film substantially devoid of silicon clusters.